Jan. 23, 1945. G. HACKETT 2,367,941

DRAW BENCH DOG

Filed Oct. 19, 1943 2 Sheets-Sheet 1

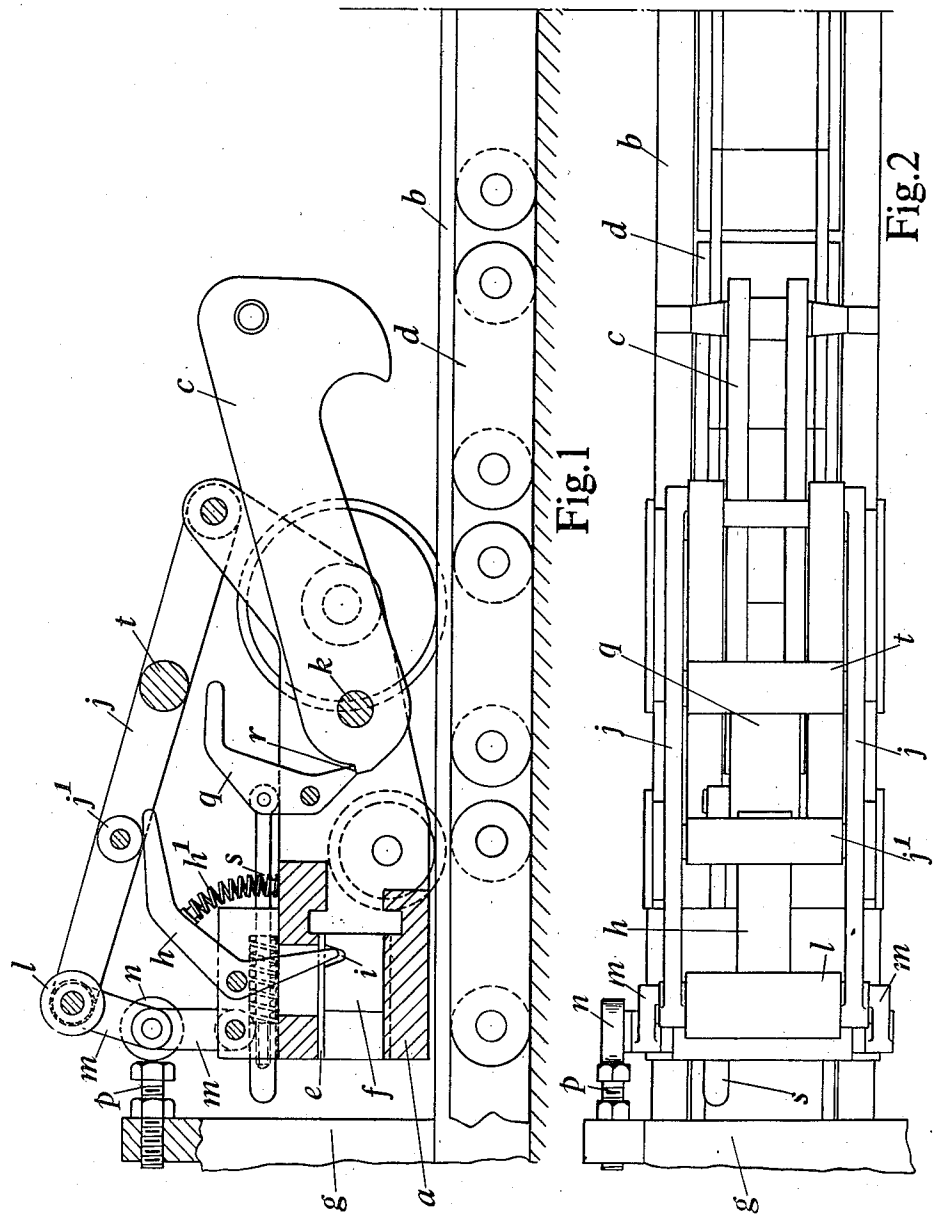


Fig.1

Fig.2

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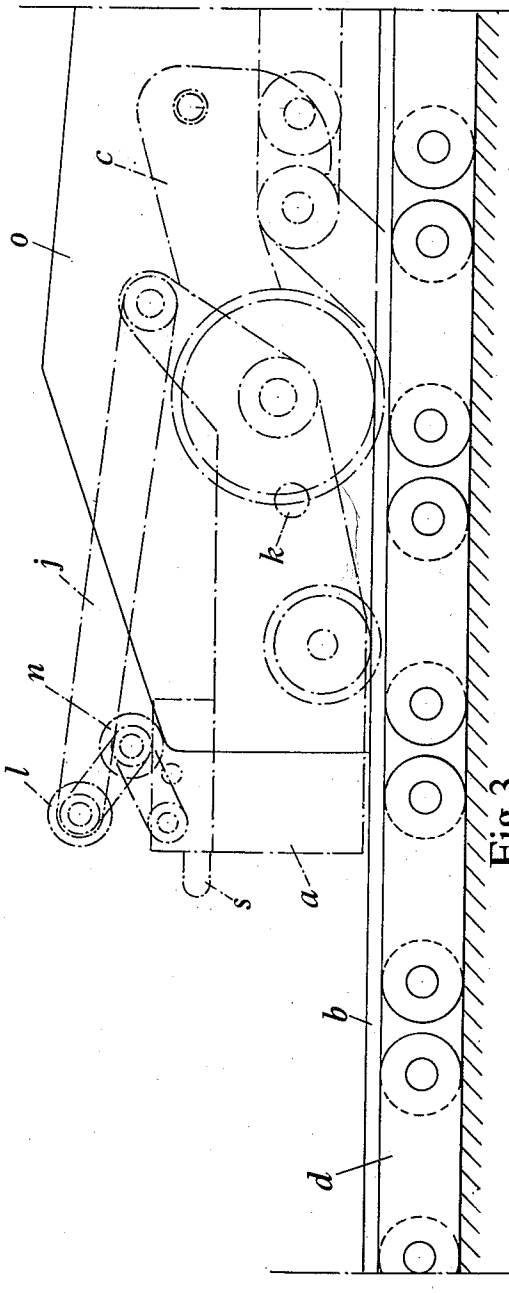


Fig.3

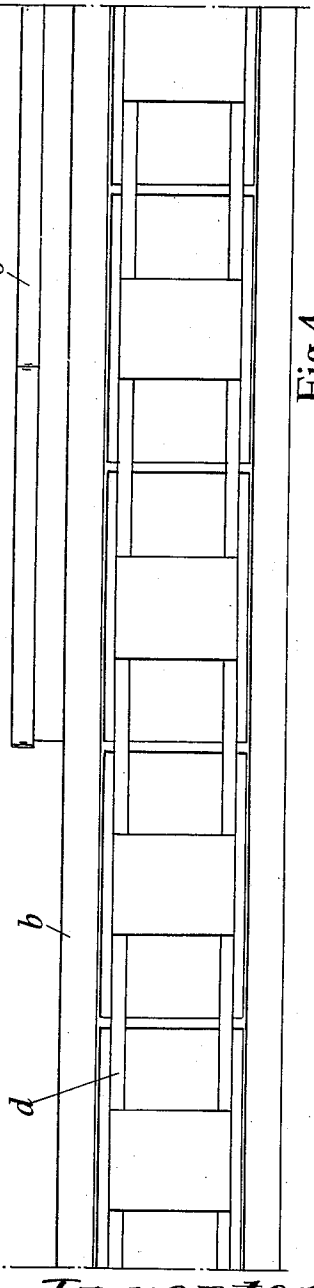


Fig.4

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DRAWBENCH DOG

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3 Claims. (Cl. 305—24)

This invention relates to the dogs used on draw benches for pulling a tube, rod or other work piece through a die.

The object of the invention is to provide improved means for effecting automatic engagement of such a dog with the end of the work piece previously inserted through the die.

In the accompanying sheets of explanatory drawings—

Figures 1 and 2 are respectively a sectional side elevation and a plan of a draw bench dog constructed in accordance with the invention, and situated on the end of a draw bench adjacent to the die through which the work piece is to be drawn.

Figures 3 and 4 are respectively a side elevation and a plan of the other end of the draw bench, the dog being shown in chain-dotted lines in Figure 3.

In carrying the invention into effect as shown I employ a carriage *a* of any convenient form adapted to be moved along the draw bench *b*. At one end of the carriage *a* is pivotally mounted a hook *c* adapted to engage an endless chain *d* in the usual manner. At the other end of the carriage is formed a recess *e* having mutually inclined sides, and in this recess are arranged a pair of wedge-like grippers as *f* adapted to engage the tagged end of a tube, or a pull-pin attached to the tube, or the end of any other form of work piece, previously inserted through a stationary die *g* on the draw bench *b*. At any convenient position adjacent to the grippers *f* there is pivoted on the carriage *a* a lever *h* having its lower end located in a transverse notch *i* in the upper sides of the grippers, the purpose of this lever being to actuate the grippers under the action of pressure applied to the upper end of the lever. Preferably and as shown the lever *h* is loaded by a spring h^1 which tends to retain it in the position in which the grippers *f* are in their open position.

For actuating the lever *h* automatically I pivot at the end of the carriage *a* adjacent to the hook pivot *k* an arm *j* consisting of a pair of interconnected and conveniently spaced side members. Alternatively the arm may be pivoted on the hook arc at the end of the carriage adjacent to the grippers. At any convenient intermediate position on the arm *j* is arranged a cross piece j^1 (which may be a roller) adapted to bear on the upper end of the gripper-actuating lever *h* and at the end of the arm adjacent to the grippers *f* is arranged a pair of toggle links *m* for supporting the arm in its upper position. Alternatively when the arm is pivoted on the carriage adjacent to the grippers the toggle links are arranged adjacent to the hook pivot. One of the toggle links *m* is pivoted on the carriage *a*, and the other is pivoted on the arm *j*, and in combination with the pivotally interconnected ends of the links is arranged a roller *n* adapted to co-operate with a cam or ramp *o* (Figures 3 and 4) secured in any convenient position on the draw bench *b*. If desired the arm *j* may be provided with a weight *l* at the end adjacent to the toggle links *m*.

To elucidate the mode of operation of the mechanism above described let it be supposed that the dog has completed a drawing action on a work piece and that it is being returned (by hand or mechanical means towards the die *g*. During this condition the arm *j* is in its upper position and is held there by the toggle links *m* which occupy a position slightly to one side of the dead centre as shown in Figure 1. Also the hook *c* is held in its upper position clear of the chain *d* in any convenient manner. When the dog reaches or approaches the die *g* the toggle links *m* encounter an adjustable or other stop *p* on the draw bench *b* or die, so that a small continued movement of the dog moves the toggle links to the other side of the dead centre. The links *m* are now free to collapse under the weight of the arm *j*, and the descent of the latter causes the gripper lever *h* to advance the grippers *f* into engagement with the end of the work piece previously inserted through the die *g*. The hook *c* is now allowed to engage the chain *d* and the dog commences its next forward travel along the bench *b* in the condition indicated by the chain-dotted lines in Figure 3. At any convenient position during the forward travel of the dog the roller *n* on the toggle links *m* encounters the cam or ramp *o*, and by the interaction of these parts the arm *j* is raised to its upper position and the toggle links are returned to the first mentioned position at one side of the dead centre. When the dog reaches the end of its forward travel the grippers *f* are released either automatically or by hand operation of the lever *h*. Also the chain *d* falls away from the hook *c* in the usual manner and the dog is returned, the cycle of action being then repeated. When the dog is returned by a weight acting through a rope, the latter is attached to the junction of the toggle links above mentioned. In this case the ramp or cam above mentioned may be dispensed with as the rope can then serve to move the toggle links for raising the arm at the beginning of each operative travel of the dog.

The means employed in the example shown

for holding the hook *c* in its upper position clear of the chain *d* during the return travel of the dog, consists of a catch lever *q* which is pivoted on the carriage *a*, and which is adapted at one end to engage a shoulder *r* on the rear end of the hook. For releasing the catch lever *q* from the hook *c* at the end of the return travel of the dog, a spring-loaded push rod *s* may be mounted on the carriage *a*, this rod having one end pivoted to the catch lever, and serving to release the catch lever when the other end of the rod comes into contact with a fixed stop which may be formed by the adjacent side of the die *g*. Alternatively the catch lever may be released by an abutment provided on or formed by another cross piece as *t* on the arm *j* when the latter descends for actuating the grippers *f*. For re-engaging the catch lever *q* with the hook *c* I make use in the known manner of the condition that when the chain *d* commences to exert its pull on the hook, the portion of the chain engaged by the hook rises above the normal horizontal line of the chain causing the forward end of the hook to rise with it. In this movement the catch lever *q* engages the hook *c* either by gravity or the action of a spring or otherwise. When at the end of the drawing operation the pull on the hook *c* is relaxed the chain *d* falls from the hook leaving the latter in the elevated position. Re-engagement of the hook *c* with the chain *d* follows withdrawal of the catch lever *q* under the action of the push rod *s* or arm *j* as above described, near the end of the return movement of the dog.

By my invention I am able to effect automatic engagement of the grippers with the work piece in a very simple and reliable manner. The invention is not, however, restricted to the example described as subordinate details may be varied to suit different requirements.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A draw bench dog comprising the combination of a carriage movable along the draw bench, wedge-like grippers slidably mounted on the carriage, a lever for actuating the grippers, a movably mounted member adapted to actuate the lever in the direction for engaging the grippers with the work piece, and a toggle device for supporting the said member in an upper inoperative position to which it can be moved during the forward movement of the carriage on the draw bench, the said device being operable to release the said member when the carriage approaches the end of its return movement, and thereby permit the said member to actuate the grippers through the lever for effecting engagement of the grippers with the work piece.

2. A draw bench dog comprising the combination of a carriage movable along the draw bench, wedge-like grippers slidably mounted on the carriage, a lever for actuating the grippers, a movably mounted member adapted to actuate the lever in the direction for engaging the grippers with the work piece, means for supporting the said member in an upper inoperative positon to which it can be moved during the forward movement of the carriage on the draw bench, the said means being operable to release the lever-actuating member when the carriage approaches the end of its return movement, and thereby permit the said member to actuate the grippers through the lever for effecting engagement of the grippers with the work piece, a hook pivotally mounted on the carriage and adapted to engage an endless chain, a catch member mounted on the carriage and adapted by engagement with the hook to hold the latter in a position clear of the chain, and an abutment on the lever-actuating member for releasing the catch member from the hook when the grippers are brought into action.

3. A draw bench dog comprising the combination of a carriage movable along the draw bench, a hook pivotally mounted on the carriage and adapted to engage an endless chain, wedge-like grippers slidably mounted on the carriage, a lever for actuating the grippers, a movably mounted member independent of the said hook and adapted under the action of gravity to actuate the lever in the direction for engaging the grippers with the work piece, and interconnecting means arranged between the said member and carriage for releasably supporting the said member in an upper inoperative position to which it can be moved during the forward movement of the carriage on the draw bench, the said means being operable to release the said member when the carriage approaches the end of its return movement, and thereby permit the said member to actuate the grippers through the lever for effecting engagement of the grippers with the work piece.

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